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Heating of the imploded plasma by fast ions in the fast ignition scheme ATSUSHI SUNAHARA, Institute for Laser Technology, TOMOYUKI JOHZAKI, Hiroshima University, HITOSHI SAKAGAMI, National Institute of Fusion Science, HIDEO NAGATOMO, SHINSUKE FUJIOKA, YASUNOBU ARIKAWA, YOUICHI SAKAWA, HIROYUKI SHIRAGA, KUNIOKI MIMA, HIROSHI AZECHI, Institute of Laser Engineering, Osaka University — In the fast ignition scheme of laser fusion, the laser-accelerated particles are used to heat the imploded plasma core. We have been tying to increase the energy coupling from heating laser to the plasma core by generating MeV fast electrons with improved high-contrast of the heating laser, usage of magnetic field, and optimization of cone shape. For further improving the energy coupling, we are trying to use laser-accelerated ion for heating plasma in addition to the heating by fast electrons. When CD plasma is directly irradiated by the ultra-intense laser, C and D ions can be accelerated as well as electrons. Based on the hole-boring model by S. C. Wilks PRL 69 (1992) 1383, ion can be accelerated up to MeV kinetic energy by ultra intense laser, and its conversion efficiency from the laser to fast ions can be estimated to be order of 1%. This ion acceleration is confirmed by PIC simulation with the FIREX condition, Sakagami et al., Nuclear fusion 49 (2009) 075026. In this paper, we show the concept and numerical analysis of ion acceleration and its energy deposition to the plasma.

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